74th Annual Denver X-ray Conference Report

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I. FORMAT, DATES, AND ATTENDANCE

The 74th Annual Conference on Applications of X-ray Analysis, commonly known as the Denver X-ray Conference (DXC), was held from August 4 to 8, 2025. The weeklong event returned to the Washington, DC metro area, taking place at the Bethesda North Marriott Hotel and Conference Center in Rockville, Maryland, USA.

X-ray and materials scientists convened to explore the latest developments in techniques, applications, software, instrumentation, and products related to XRD and XRF analysis. With a dynamic mix of attendees and exhibitors, the conference welcomed over 325 X-ray scientists, more than 30% of whom traveled from outside the United States.

II. DXC WORKSHOPS

The technical program kicked off with 14 half-day tutorial workshops held on Monday and Tuesday of conference week. Workshops were categorized into XRD, XRF, or Special Topics, and were designed to accommodate both beginner and advanced participants. A total of 25 subject-matter experts were invited to serve as instructors, many of whom provided handouts made available on a private website exclusively for attendees. Topics included:

Data Processing of Total Scattering and How to Avoid Pitfalls Along the Way
Intermediate to Advanced XRD – Parts 1 & 2
Basic XRF
Environmental Analysis
Micro XRF & Trace Analysis
Quantitative Analysis of XRF
Methods for Complex Multi-Phase Samples
Mapping Analysis – Parts 1 & 2
Advancing Science through Data Informatics: Publishing, Validation, and Applications
Spectra Processing Using PyMCA
Raman Spectroscopy for Mineral Identification
Benchtop and Handheld Applications

III. PLENARY SESSION AND DXC AWARDS

The Plenary Session, titled "From Waste to Resource: Nanoplastics, Circular Chemistry, and Microanalysis," was held on Wednesday morning, marking the opening of the oral presentations that continued over the next 3 days of conference week. Peter Wobrauschek of the Atominstitut – TU Wien chaired the session, which began with an awards presentation.

The Barrett Award, presented biennially in recognition of outstanding contributions to the field of powder diffraction, was awarded to Vanessa Peterson of Australia's Nuclear Science and Technology Organisation (ANSTO). Dr. Peterson received the award for the development of real-time methods for structure/dynamic property characterization of energy-related materials using neutron and X-ray scattering.

The Jenkins Award, presented biennially to recognize scientists for lifetime achievement in advancing the use of X-rays in materials analysis, was awarded to Dr. Tom Blanton of the International Centre for Diffraction Data (ICDD), USA, and Dr. George Havrilla of Los Alamos National Laboratory, USA.

Dr. Blanton received this award for his contributions to the applications of X-ray diffraction and X-ray analysis. This includes the development of nanomaterials, low-angle standards, and the characterization and application of non-crystalline material references, including many common polymers, silicates, and pharmaceuticals. These efforts were complemented by his work in teaching diffraction principles and advanced methods around the globe at ICDD Workshops and Courses. He is a prolific author, and his works are frequently cited in publications, reference books, and international patents. His efforts at the ICDD, as Principal Scientist and Executive Director, have directly led to the global growth of powder diffraction for materials analysis.

Dr. Havrilla received this award for his contributions to the invention, development, and application of confocal X-ray fluorescence analysis. He developed methods for 3D elemental mapping of materials utilizing polycapillary optics. His analysis methods have been used in applications ranging from archaeological studies to modern forensics. He developed methods for nuclear material analyses, measuring elements and their distributions in spent fuels, enhancing energy security. His research also involved specimen preparation, particularly with microfluidic devices at nano- and picoliter volumes to analyze liquids using dried spot technology with micro-XRF.

Ten outstanding young scientists received the 2025 Robert L. Snyder Student Grant Award. The awardees and the works they presented at the conference were:

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Md (Ashik) Ashikuzzaman, University of Massachusetts Amherst, USA, *Mineralogical and Maturity Analysis of Glauconite Sands from the U.S. Atlantic Coastal Plain: Implications for Offshore Wind Foundation Design*

Thulani De Silva, Trinity College Dublin, Ireland, *EDXRF, a Means of Rapid Chemical and Physiochemical Characterization of Peat-Alternative Growth Media and Raw Materials*

Daniel Dodoo, University of Melbourne, Australia, *Characterising and Predicting the Flotability of Gangue Minerals from X-ray Diffraction Patterns: A Case Study of Talc*

Cole Franz, The University of Tennessee, Knoxville, USA, *Evolution of Accumulated Plastic Strain at Fine Length-Scale in Solid-State Additive Process*

Shunsuke Hashizume, Meiji University, Japan, *Elemental Distribution Measurement of MSWI Fly Ash and Soil-Mixed Geopolymer by Micro-Focused X-ray Fluorescence Spectrometry*

Rawan Hirzalla, The Hebrew University of Jerusalem, Israel, *2D Metal Halide Perovskites with Iodo-aromatic Ligands – Structural and Optoelectronic Properties*

Toluwalase Ogunsunlade, Pennsylvania State University, USA, *Effect of Mechanical Activation on the Underclay Component of Coal Refuse*

Jorge Luis Rodríguez Alejandre, Universidad Michoacana de San Nicolás de Hidalgo, Mexico, *Analytical Characterization of the Benchtop TXRF Spectrometric Analysis of Two Se Metabolites in Simulated Human Urine*

Eduardo Santos, University of São Paulo, Brazil, *The Mobility Paradox: Tracing Calcium Foliar Absorption and Transport in Tomato Plants*; *An In-House X-ray Fluorescence Spectrometer Development for in vivo Analysis of Plants*; and *Synchrotron Applied for Plant Analysis*

Hibiki Shirata, Meiji University, Japan, *Evaluation for Preferred Orientation of Natural Fluorite Crystals*

Following the awards presentation, the plenary session continued with three captivating keynote talks delivered by Florian Meirer (Utrecht University, Netherlands), Michael Fischlschweiger (Clausthal University of Technology, Germany), and Stefan Vogt (Argonne National Laboratory, USA).

Dr. Meirer opened the session with his talk, *Detecting Nanoplastics – Challenges for Environmental Analysis.* He was followed by Dr. Fischlschweiger, who presented *Recycling of Lithium-Ion Batteries – Engineering Artificial Minerals as a Promising Approach.* The session concluded with Dr. Vogt's presentation, *The Upgraded APS – Status, Early Results, and Emerging Opportunities.*



Photo 1. Plenary Speakers (L–R) – Michael Fischlschweiger, Florian Meirer, Stefan Vogt, and Peter Wobrauschek (Session Chair).

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The session was well attended and provided valuable insights into future advancements in science and technology.

IV. SPECIAL SESSIONS

From Wednesday afternoon to Friday morning, 13 half-day oral sessions were held. More than 90 presentations were delivered, including 30 invited talks by experts in their respective fields. Topics included:

New Developments in XRD & XRF Instrumentation
Early Career Researchers: Spotlight on the Next Generation
Industrial Applications and Quantitative Analysis of XRF
Mining, Recycling, and Sustainable Materials
XRD Methods for Multi-Phase Identification – Parts 1 & 2
Trace Environmental, including TXRF
Machine Learning Techniques in X-ray Analysis
Structure Elucidation via PDF
Spatially-Resolved Benchtop Micro-XRF
Stress and Texture Analysis
Non-Ambient Measurements
General XRF

V. POSTER SESSIONS

Poster presentations took place on Monday and Tuesday evenings during the XRD and XRF poster sessions. Attendees had the opportunity to preview electronic copies of the posters in advance through the conference mobile app, Whova. A panel of respected judges evaluated the submissions, and the competition for best posters was strong.

Ultimately, the following presenters were named winners:

XRD Best Poster Awards:

Elena Marchetti*, M. Fleming, C. Brenna, J. Swift, Georgetown University, USA, for their work: *Tuning the Moisture Sorption Properties of Cytosine*

Rawan Hirzalla*, I. Hadar, The Hebrew University of Jerusalem, Israel, for their work:

2D Metal Halide Perovskites with Iodo-aromatic Ligands – Structural and Optoelectronic Properties

Mary Elias*, J. Herder, C. Cahill, The George Washington University, USA, for their work: *Synthesis and Photoreactivity*



Photo 2. XRD Poster Session Award Winners (L–R) – Omololu Makinde, Mary Elias, Elena Marchetti, Rawan Hirzalla, and Tom Watkins (Poster Judge).

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Photo 3. XRF Poster Session Award Winners (L–R) – Diane Eichert (Poster Judge), Martina Schmeling (Poster Judge), Eduardo Santos, Lindsey Hernandez, Jessica Grealy, Josh Ramirez, and Kristen Reese.

of Uranyl-Viologen Materials as a Function of Molecular Assembly

Omololu Makinde*, United States Army & University of South Florida, USA, for their work: *Developing Radiation Response Function with XRD and Machine Learning*

We would like to thank Rigaku for sponsoring an additional Best Student Poster Award during the XRD Poster Session.

Omololu Makinde*, United States Army & University of South Florida, USA, for their work: *Developing Radiation Response Function with XRD and Machine Learning*

XRF Best Poster Award:

Kristen Reese, U.S. Food and Drug Administration, USA, for their work:

Determination of Arsenic (As) and Lead (Pb) in Color Additives Containing the Overlapping Major Element Bromine (Br) by X-ray Fluorescence Spectrometry

Jessica Grealy, L. Hernandez, J. Ramirez, Owens Corning, USA, for their work:

Building a Circular Economy: Using XRF and XRD to Evaluate Slags for Use in Stone Wool Production

Eduardo Santos, University of São Paulo, Brazil, for their work:

Synchrotron Applied for Plant Analysis

We would like to thank three of our exhibitors for sponsoring additional Best Poster Awards during the XRF Poster Session: Amptek, Inc., Rigaku, and XOS.

Amptek Award for Best Student XRF Poster:

Eduardo Santos, G. Montanha, H. de Carvalho, University of São Paulo, Brazil, for their work:

An In-House X-ray Fluorescence Spectrometer Development for in vivo Analysis of Plants

Rigaku Best Student Poster Award:

Shunsuke Hashizume, H. Shirata, S. Inose, T. Honda, Y. Koike, Meiji University, Japan, for their work:

Elemental Distribution Measurement of MSWI Fly Ash and Soil-Mixed Geopolymer by Micro-Focused X-ray Fluorescence Spectrometry

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XOS Innovation Award™:

1st Place:

Sarah Gosling*, L. Adams, M. Kitchen, C. Greenwood, Keele University, United Kingdom.

E. Arnold, K. Geraki, T. Snow, Diamond Light Source, United Kingdom.

P. Cool, The Robert Jones and Agnes Hunt Orthopaedic School & Keele University, United Kingdom.

I. Lyburn, Gloucestershire Hospitals NHS Foundation Trust & Cobalt Medical Charity & Cranfield University, United Kingdom

K. Rogers, Cranfield University, United Kingdom

N. Stone, University of Exeter, United Kingdom, for their work:

Exploring the Elemental Composition of Calcifications in Prostate Cancer

Runner Up:
Kouichi Tsuji*, A. Okada, Osaka Metropolitan University, Japan, for their work:

Fast Discrimination of X-ray Fluorescence Peaks from Spectrum Background Using Support Vector Machines

VI. EXHIBITS AND SPONSORSHIPS

The exhibit hall featured 39 companies showcasing a wide range of products and services for the X-ray community. For a complete list of exhibitors and their product descriptions, please refer to the 2025 Onsite Program available at www.dxcicdd.com. The Denver X-ray Conference extends sincere thanks to all exhibitors for their valuable support this year.

Many exhibitors also contributed as conference sponsors, including Amptek, Inc., Anton Paar, Bruker, DECTRIS, ICDD, KETEK GmbH, Materials Data, Micro X-Ray, Moxtek, Inc., Petrick GmbH, Proto Manufacturing, Rigaku Americas, SmarAct GmbH, and XOS. Their generous support plays a vital role in maintaining the high quality of the conference while helping to keep attendee costs affordable. We are truly grateful for their continued partnership.

VII. WEBSITE AND PROCEEDINGS

To view the complete DXC Program, please visit the "Past DXC" page on the conference website, located under the "About DXC" tab at www.dxcicdd.com. The conference proceedings, Advances in X-ray Analysis, Volume 69, will be published in summer 2026, and selected papers will also appear in the *Powder Diffraction Journal.* For free full access to manuscripts published in Volumes 40 to 68 of Advances in X-ray Analysis, please visit the "Resources" tab on the ICDD website at www.icdd.com.

VIII. THANK YOU

The Conference Services team at ICDD extends sincere thanks to everyone who volunteered their time and effort to help organize this year's event. Members of the DXC Organizing Committee, Session Chairs, Workshop Instructors, Invited and Contributed Speakers, and Exhibitors each played a vital role in bringing the community together.

We also offer special thanks to the attendees who joined us. The success of the conference is a direct result of the dedication and participation of every individual involved. We are genuinely grateful to all of you!

IX. 2026 MEETING

Save the date! In 2026, the Denver X-ray Conference (DXC) will celebrate its 75th anniversary from August 3 to 7 at The Westin Chicago Lombard in Lombard, Illinois, USA. We invite you to join us for this special milestone as we celebrate 75 years of innovation, collaboration, and community in X-ray science!

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